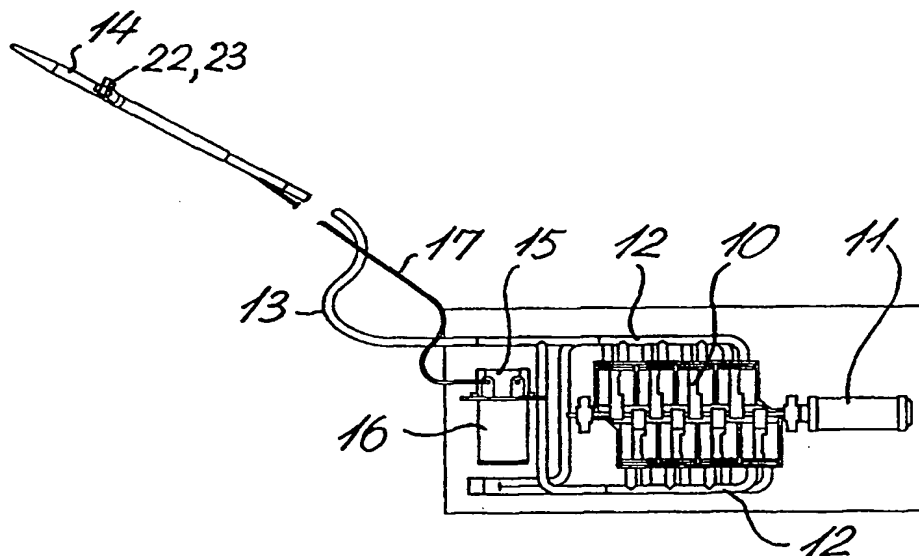




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(54) Title: A METHOD FOR SELECTIVELY GENERATING A FLOW OF GAS FROM AN OPEN END OF A TUBULAR BODY, SUCH AS A HOSE



## (57) Abstract

A flow of gas through a tubular body (13, 14) is provided selectively by connecting the tubular body directly to a gas outlet of a gas compressor (10) without any intermediate compressed air container. The operation of the compressor is started when the gas flow is to be initiated, and the gas flow is stopped by stopping the operation of the compressor. The tubular body or nozzle may comprise a wall part made from a resilient material. The open free end of the tubular body may then be at least partly closed and subsequently reopened while the compressor (10) is still operating, so as to temporarily expand the resilient wall part. Thereby a pressure pulse may be generated. The air flow may be used by a dentist for cleaning teeth.

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A method for selectively generating a flow of gas from an open end of a tubular body, such as a hose

The present invention relates to a method for selectively generating a flow of gas from  
5 an open end of a tubular body, such as a hose.

A conventional system for producing a flow of pressurised air comprises a compressor, a pressure tank to which pressurised air is delivered from the compressor. The function of the compressor is controlled in dependency of the pressure in the tank so  
10 as to maintain the air pressure in the pressure tank substantially at a desired level. Such conventional system comprises air separators and valves which must be able to close tightly.

The present invention provides a method rendering it possible to selectively generate  
15 an air flow in a manner which is much more simple than by using conventional pressurised air systems.

Thus, the present invention provides a method for selectively generating a flow of gas from an open first end of a tubular body, said method comprising connecting a second  
20 end of the tubular body directly to a gas outlet of a gas compressor, starting the operation of the compressor so as to start the gas flow, and stopping the gas flow by stopping the operation of the compressor. This method does neither require the use of a pressure tank, water separators, nor pressure tight valves. Furthermore, a gas compressor having a relatively small capacity can be used as long as the  
25 compressor is able to deliver the desired gas flow.

Therefore, when a gas flow having a predetermined flow rate is desired, the capacity of the gas compressor may be selected so as to obtain the desired gas flow rate through said open free end of the tubular body.

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In the method according to the invention generation of the gas flow may be started and stopped by starting and stopping the gas compressor. This means that when the compressor is driven by an electric motor, the operation of the electric motor and thereby generation of the gas flow may be started and stopped by actuating an

electric switch. In order to facilitate operation of the compressor such on/off switch for controlling power supply to the electric motor is advantageously positioned on the tubular body at or adjacent to its open first end.

- 5 If the open first end which may, for example, be in the form of a nozzle, is unobstructed the gas flow rate will be substantially constant when the gas compressor is operating. However, the tubular body may comprise a wall part being made from a resilient material. If the open first end of the tubular body is then at least partly closed and subsequently reopened while the compressor is still operating, the resilient wall  
10 part will be temporarily expanded, whereby a pressure pulse may be generated. This may be helpful in situations where a short, more powerful gas flow is needed.

The open first end of the tubular body may have a valve or a manually operateable obstructing member which may be moved between positions in which the first end of  
15 the tubular body is at least partly obstructed and substantially unobstructed, respectively. In the preferred embodiment, however, the wall part defining or being adjacent to the open first end of the tubular body is made from a resilient material. The open first end of the tubular body may then be at least partly closed by compressing said resilient wall part.

20

The first open end may be in the form of or may be connected to a nozzle, and liquid, such as water or an aqueous liquid containing one or more additives may then selectively be introduced into the open first end part of the tubular body or into the nozzle. When a liquid flow is introduced while the gas compressor is inoperative a  
25 liquid flow may be generated through the open first end of the tubular body. If liquid is introduced into tubular body when the gas compressor is operating an aerosol flow may be generated.

A flow of gas, liquid or aerosol generated by using the method according to the  
30 invention may e.g. be used for blow cleaning any kind of articles, such as electronic articles, and a liquid detergent may then be introduced into the tubular body. Alternatively, the liquid being introduced into the tubular body or nozzle may be a disinfectant. The flow of gas, such as air, the flow of liquid, such as water, and the

flow of aerosol, which may be generated by the method according to the invention is especially suited for use by dentists for cleaning the teeth of a patient.

The present invention also provides an apparatus for selectively producing a gas flow, 5 said apparatus comprising a gas compressor having a gas inlet and a gas outlet, an electric motor for driving the gas compressor, means for switching the electric motor on and off, and a tubular body having an open first end part and second opposite end part communicating directly with the gas outlet of the compressor, the capacity of the compressor being such that a desired gas flow through the first open end part is 10 obtained when the gas compressor is operating. The apparatus according to the invention is much more simple and more easy maintain than conventional systems for producing pressurised air

The switching means is preferably positioned on the tubular body at or adjacent to the 15 open first end of the tubular body so that an operator who is gripping said open first end part may conveniently operate the switching means. The tubular body may comprise at least one resilient wall part and manually operateable means, such as valve means or other obstruction means, may then be provided for selectively closing the open end of the tubular body at least partly. At least the first end part of the 20 tubular body may be made from a resilient material so that it may be compressed and thereby at least partly closed.

The apparatus according to the invention may further comprise an outer tube section made from a stiff material and surrounding the free first end part of the tubular body. 25 The manually operateable closing means, such as a pinching device, may then be mounted on this outer tube section. As an example, the switching means may comprise a micro switch embedded in the resilient wall of the free end part of the tubular body. The switching means may then automatically be actuated when the manually operateable means are operated in order to at least partly compress and 30 close the open first end part of the tubular body.

The apparatus according to the invention may further comprise a liquid delivery tube opening into the free end part of the tubular body, and means for selectively delivering liquid into the free end part of the tubular body via the delivery tube. These liquid

delivery means may comprise a liquid pump and an electric motor for driving the pump and the operation of the electric motor driving the pump may be controlled by switch means which are arranged at or adjacent to the first end part of the tubular body. The said first end part of the tubular body or hose, or said outer tube section may be in the form of a nozzle, or the tubular member or hose may be connected to such nozzle. An operator holding the nozzle in his hand may then conveniently control the function of not only the gas compressor, but also of the liquid pump.

The open end of the liquid delivery tube is preferably directed towards the open end of the tubular body so that a liquid jet leaving the liquid delivery tube may pass further through the open end of the tubular body which may, for example, be in the form of a hose of a resilient material.

The invention will now be further described with reference to the drawings, wherein Fig. 1 is a diagrammatic side view of an embodiment of the apparatus according to the invention.

Fig. 2 is a side view in an enlarged scale of a nozzle formed at the free end of a hose forming part of the apparatus shown in Fig. 1,

Fig. 3 is an end view of the nozzle shown in Fig. 2,

Figs. 4 and 5 are sectional views illustrating the function of a manually operateable switching and valve device, and

Fig. 6 is a perspective view of a coupling device.

The drawings illustrate an apparatus or unit for selectively generating a flow of air or gas, a flow of water or another liquid, or both. Such apparatus is suited for use by dentists for cleaning and treating the teeth of a patient.

The apparatus shown in Fig. 1 comprises a piston compressor 10 comprising a suitable number of cylinders. In the present case four cylinders are arranged on either side of a common crank shaft. The shaft of a brushless DC electric motor 11 is connected to the crank shaft, e.g. by means of a coupling device as that described in a Danish patent application (filed at the same time as the present application, our ref. 21121DK1). The manifold tubes 12 of the compressor are connected to a hose 13 having a nozzle 14 formed at its free end. A liquid pump 15 is driven by an electric

motor 16 which may correspond to the electric motor 11, and the outlet of the pump 15 is connected to a tube 17 having a free end opening into the free end or nozzle of the hose 13, vide Fig. 2.

5 The free end of the hose 13 is received in a nozzle tube 18 which may be made from a relatively stiff material, such as metal or plastic, while the hose 13 is preferably made from a resilient, elastic material, such as rubber, silicone or a soft plastic material. The free ends of the hose 13 and of the tube 17 open into the nozzle tube at the free end of the nozzle and as illustrated in Fig. 2. A flexible valve arm or switching  
10 arm is mounted on the outer surface of the nozzle tube 18. An obstruction member 20 extends inwardly from the free end of the arm 19 and is positioned oppositely to a cut-out or opening 21 formed in the nozzle tube 18. The free end of the arm 19 also carries a pair of electric switches 22 and 23 for controlling the function of the electric motors 11 and 16, respectively.

15

When the switch 22 is depressed the electric motor 11 is started so that a flow of air or gas through the hose 13 and out from the opening of the nozzle 14 is generated. The air flow may be stopped by the depressing the switch 22 once again so as to stop the electric motor 11 and the compressor 10. Similarly, a flow of water or another  
20 liquid may be generated by depressing the switch 23 whereby the electric motor 16 is started. It is also possible to depress the switches 22 and 23 at the same time so as to generate a flow of air and water or another liquid. The rate and force of the flows generated correspond to the capacity of the compressor 10 and the liquid pump 15, respectively.

25

However, in some situations the operator or dentist may want to generate a more forceful flow pulse. This may be obtained by applying an increased force to the switch 22 and/or 23 so as to flex the arm 19 inwardly, whereby the obstruction member is passed through the opening or cut-out 21 and locally pinches the hose 13 as best  
30 illustrated in Fig. 4 and 5. When the hose 13 is pinched as illustrated in Fig. 5 and a compressor 10 and/or the pump 15 continue(s) to operate the hose section being upstream of the obstruction member 20 will be elastically expanded. When the operator shortly after releases the switches 22 and/or 23 the arm 19 and the obstruction member 20 return to the starting position shown in Fig. 4. Now the

elastically expanded tube 17 return to its normal position whereby a pressure pulse is generated in the flow of air and/or liquid.

Fig. 6 shows a coupling device 25 for transmission of torque between a pair of substantially aligned shaft ends 26 and 27. The coupling device is in the form of a tubular member made by a helically wound wire, which may, for example, be made of metal or plastic. The opposite end parts of the wound tubular member 25 snugly receive the adjacent shaft ends 26 and 27 therein so that the friction between the outer peripheral surfaces of the shafts and the inner surface of the tubular coupling device may be sufficient to transmit the necessary torque between the shafts 26 and 27. However, in order to increase the torque which may be transmitted, a free wire end 28 at one or at each end of the tubular coupling device 25 may be received in a slot 29 or another recess formed in the shaft 27.

The coupling device according to the invention induces a certain flexibility in the torque transmission. Furthermore, the coupling device 25 may be used also when the shaft ends 26 and 27 are not in complete alignment. This means that the coupling device may be inserted between shaft sections in order to allow increased tolerances. Thus, the crankshaft of the small scale piston compressor 10 may be divided into lengths or sections which are interconnected by flexible coupling devices 25.

The apparatus shown in Fig. 1 may be formed as a hand held unit and may replace much more bulky and space consuming conventional pressurized air systems. The apparatus according to the invention may be made portable or may be built into a unit also containing other kinds of dentist tools and apparatuses.

## CLAIMS

1. A method for selectively generating a flow of gas from a open first end of a tubular body, said method comprising
  - 5 connecting a second end of the tubular body directly to a gas outlet of a gas compressor,  
starting the operation of the compressor so as to start the gas flow, and  
stopping the gas flow by stopping the operation of the compressor.
- 10 2. A method according to claim 1, wherein the capacity of the gas compressor is selected so as to obtain the desired gas flow rate through said open free end of the tubular body.
3. A method according to claim 1 or 2, wherein the compressor is driven by an
  - 15 electric motor, the operation of the electric motor being started and stopped by actuating a switch positioned on the tubular body at or adjacent to its first open end so as to control power supply to the electric motor.
4. A method according to any of the claims 1-3, wherein the tubular body comprises
  - 20 a wall part being made from a resilient material, the open first end of the tubular body being at least partly closed and subsequently reopened while the compressor is still operating, so as to temporarily expand the resilient wall part, whereby a pressure pulse may be generated.
- 25 5. A method according to claim 4, wherein the wall part defining the open first end of the tubular body or being adjacent thereto is made from a resilient material, the open first end of the tubular body being at least partly closed by compressing said resilient wall part.
- 30 6. A method according to any of the claims 1-5, wherein liquid is selectively introduced into the open first end part of the tubular body forming a nozzle.
7. A method according to claim 6, wherein liquid is introduced into tubular body when the gas compressor is operating.



8. A method according to claim 6, wherein the liquid is sprayed out from the open free end of the tubular body when the gas compressor is not operating.
- 5 9. A method according to any of the claims 1-8, wherein the gas flow generated is a flow of air used by a dentist for cleaning the teeth of a patient.
10. An apparatus for selectively producing a gas flow, said apparatus comprising  
a gas compressor having a gas inlet and a gas outlet,  
10 an electric motor for driving the gas compressor,  
means for switching the electric motor on and off, and  
a tubular body having an open first end part and a second opposite end part communicating directly with the gas outlet of the compressor, the capacity of the compressor being such that a desired gas flow through the open first end part is  
15 obtained when the gas compressor is operating.
11. An apparatus according to claim 10, wherein the switching means is positioned on the tubular body at or adjacent to the open first end of the tubular body.
- 20 12. An apparatus according to claim 10 or 11, wherein the tubular body comprises at least one resilient wall part, manually operateable means being provided for selectively closing the open end of the tubular body at least partly.
13. An apparatus according to claim 12, wherein at least the first end part of the  
25 tubular body is made from a resilient material.
14. An apparatus according to claim 13, further comprising an outer tube section made from a stiff material and surrounding the first end part of the tubular body, the manually operateably closing means being mounted on the outer tube section.
- 30 15. An apparatus according to claims 13 or 14, wherein the switching means comprise a micro switch embedded in the resilient wall of the first end part of the tubular body, the switching means being actuated when the manually operateable

means are operated so as to at least partly compress and close the first end part of the tubular body.

16. An apparatus according to any of the claims 10-15, further comprising a liquid  
5 delivery tube opening into the first end part of the tubular body, and means for selectively delivering liquid into the first end part of the tubular body via the delivery tube.

17. An apparatus according to claim 16, wherein the liquid delivery means comprise a  
10 liquid pump and an electric motor for driving the pump, the operation of the electric motor driving the pump being controlled by switch means arranged at or adjacent to the first end part of the tubular body.

18. An apparatus according to claim 16 or 17, wherein the open end of the liquid  
15 delivery tube is directed towards the open end of the tubular body.

19. An apparatus according to any of the claims 10-18, wherein the tubular body is in the form of a hose of a resilient material.

20. An apparatus according to any of the claims 10-19, wherein the tubular body is of the type used by dentists for cleaning teeth.

21. An apparatus according to any of the claims 10-20, wherein the electric motor is a brushless DC-motor.

25

22. An apparatus according to any of the claims 10-21, wherein the gas compressor is a piston compressor comprising a crank shaft comprising crank sections interconnected with said pistons, adjacent crank sections being flexibly interconnected by a flexible coupling device.

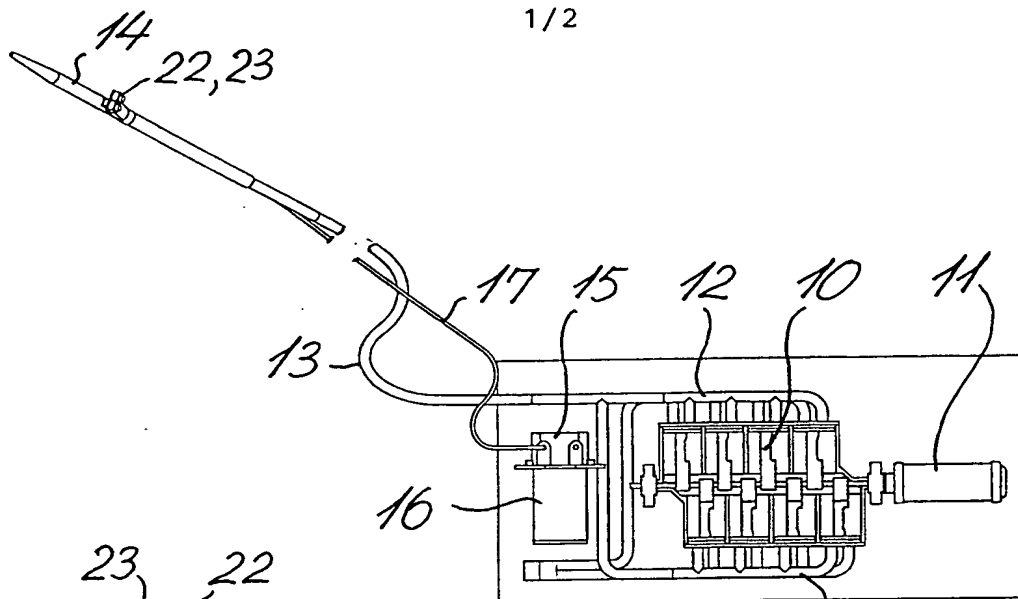
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23. An apparatus according to claim 22, wherein the coupling device comprises a tubular member formed by a helically wound thread or wire, opposite ends of the tubular members being connected to adjacent, substantially aligned shaft ends of said crank sections.

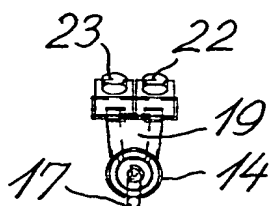
24. An apparatus according to claim 23, wherein opposite open ends of the tubular member are adapted to receive and surround said respective shaft ends.

5 25. An apparatus according to claim 24, wherein at least one of the opposite ends of the tubular member is adapted to frictionally engage with the peripheral surface of the respective shaft end.

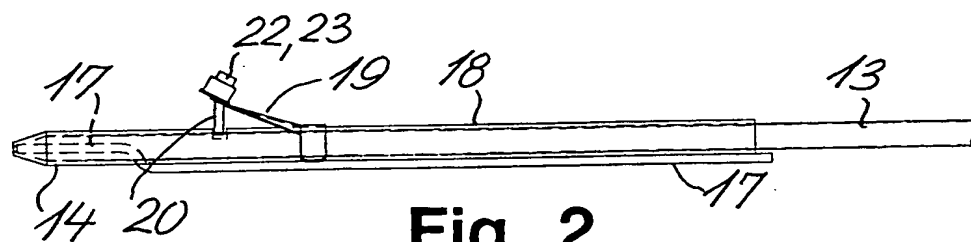
26. An apparatus according to any of the claims 23-25, wherein a free end of the  
10 thread or wire extends transversely into at least one of said opposite ends of the tubular member and is received in a slot or recess formed in the corresponding shaft end.



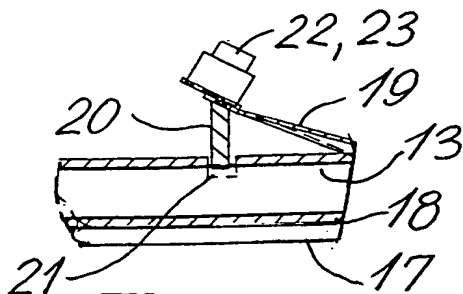
**Fig. 1**



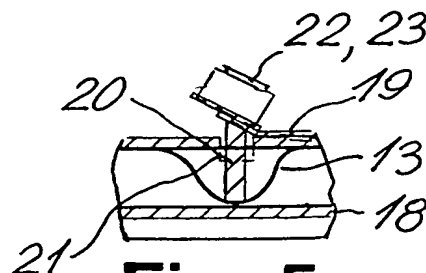
**Fig. 3**



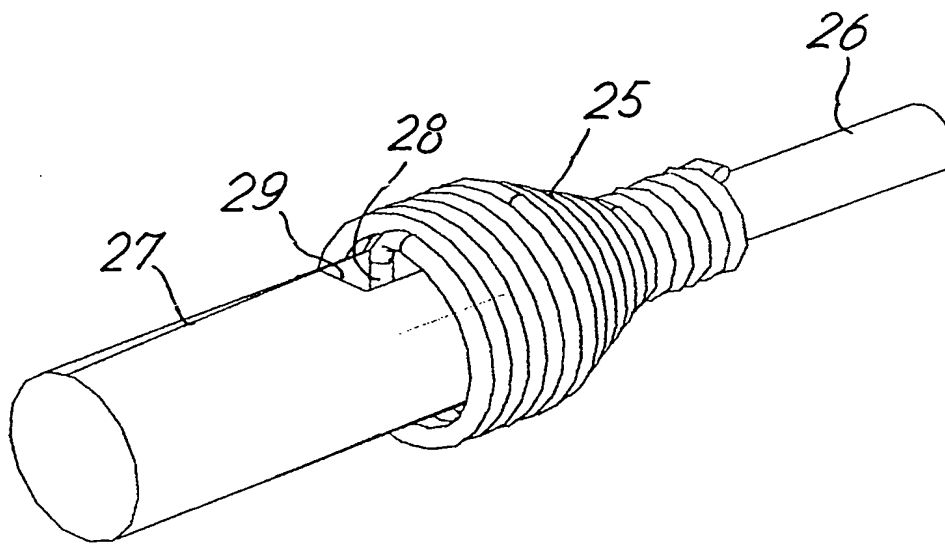
**Fig. 2**



**Fig. 4**



**Fig. 5**



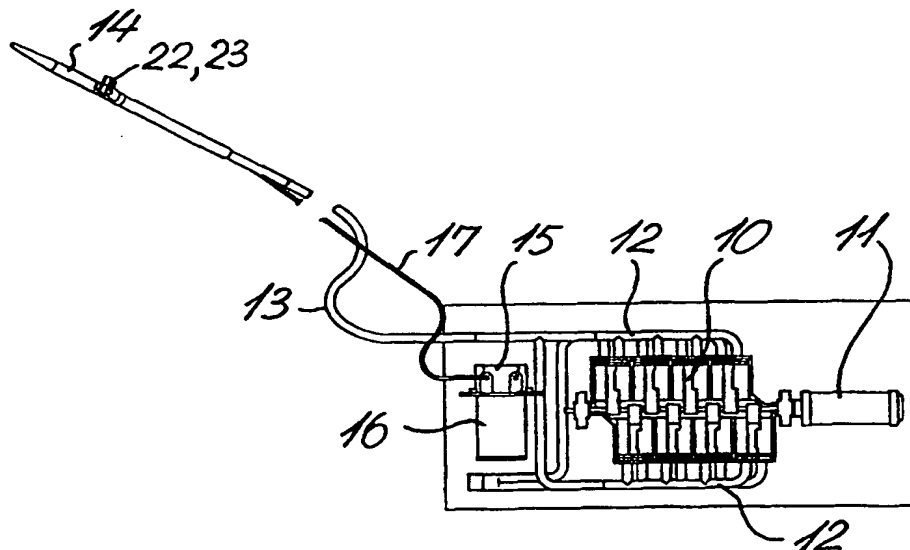
**Fig. 6**



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<b>(51) International Patent Classification <sup>6</sup>:</b> A61C 17/022, 1/00, B05B 1/00, A61C 17/028, 17/02, F04B 39/00, F01B 9/02, F16F 1/12	<b>A3</b>	<b>(11) International Publication Number:</b> <b>WO 99/48613</b>  <b>(43) International Publication Date:</b> 30 September 1999 (30.09.99)
<b>(21) International Application Number:</b> PCT/DK99/00165  <b>(22) International Filing Date:</b> 24 March 1999 (24.03.99)  <b>(30) Priority Data:</b> 0428/98                      25 March 1998 (25.03.98)                      DK  <b>(71) Applicant (for all designated States except US):</b> REIPUR TECHNOLOGY A/S [DK/DK]; Gentoftegade 118-120, DK-2820 Gentofte (DK).  <b>(72) Inventor; and</b> <b>(75) Inventor/Applicant (for US only):</b> REIPUR, John [DK/DK]; Fabritius Allé 17, DK-2930 Klampenborg (DK).  <b>(74) Agent:</b> PLOUGMANN, VINGTOFT & PARTNERS; Sankt Annæ Plads 11, DK-1250 Copenhagen K (DK).		<b>(81) Designated States:</b> BR, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  <b>Published</b> <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims</i> <i>and to be republished in the event of the receipt of amendments.</i>  <b>(88) Date of publication of the international search report:</b> 25 November 1999 (25.11.99)

**(54) Title:** A METHOD FOR SELECTIVELY GENERATING A FLOW OF GAS FROM AN OPEN END OF A TUBULAR BODY, SUCH AS A HOSE

**(57) Abstract**

A flow of gas through a tubular body (13, 14) is provided selectively by connecting the tubular body directly to a gas outlet of a gas compressor (10) without any intermediate compressed air container. The operation of the compressor is started when the gas flow is to be initiated, and the gas flow is stopped by stopping the operation of the compressor. The tubular body or nozzle may comprise a wall part made from a resilient material. The open free end of the tubular body may then be at least partly closed and subsequently reopened while the compressor (10) is still operating, so as to temporarily expand the resilient wall part. Thereby a pressure pulse may be generated. The air flow may be used by a dentist for cleaning teeth.

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# INTERNATIONAL SEARCH REPORT

Application No  
PCT/DK 99/00165

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 6    A61C17/022    A61C1/00    B05B1/00    A61C17/028    A61C17/02 F04B39/00    F01B9/02    F16F1/12		
According to International Patent Classification (IPC) or to both national classification and IPC		
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used)		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	page 3, line 55 - page 4, line 94; figure 2	22
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A	DE 32 23 465 A (PROGRESSIVE MACHINE PRODUCTS) 13 January 1983 (1983-01-13) page 9, line 1 - paragraph 2 page 10, paragraph 2 - page 11, paragraph 1; figures 1,3	1, 10
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X	US 4 108 178 A (BETUSH) 22 August 1978 (1978-08-22)	1,4-7, 12-16, 18,19
A	column 1, line 47 - line 50 column 2, line 38 - column 3, line 3; figure 1	8,17
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Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl. Fax: (+31-70) 340-3016		Authorized officer  <div style="text-align: center; font-weight: bold;">Guastavino, L</div>



## INTERNATIONAL SEARCH REPORT

Application No  
PCT/DK 99/00165

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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		22

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/DK 99/ 00165

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

CLAIMS 1-3, 9, 10, 11, 20  
CLAIMS 4, 5, 12-15, 19  
CLAIMS 6-8, 16-18  
CLAIM 21  
CLAIMS 22-26

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☒ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

# INTERNATIONAL SEARCH REPORT

Application No  
PCT/DK 99/00165

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2253351 A	09-09-1992	NONE	
DE 3223465 A	13-01-1983	US 4375963 A JP 1421234 C JP 58004550 A JP 62029051 B	08-03-1983 29-01-1988 11-01-1983 24-06-1987
US 4108178 A	22-08-1978	NONE	
WO 8300094 A	20-01-1983	US 4372307 A JP 58501018 T	08-02-1983 30-06-1983
FR 1269231 A	15-12-1961	NONE	
FR 2707869 A	27-01-1995	DE 19500165 A US 5636987 A	11-07-1996 10-06-1997
US 5297545 A	29-03-1994	NONE	
FR 2670246 A	12-06-1992	NONE	
FR 1387521 A	19-05-1965	NONE	
WO 9603601 A	08-02-1996	PL 304502 A	05-02-1996
JP 62265478 A	18-11-1987	NONE	
DE 8803169 U	21-04-1988	DE 3840900 A	21-09-1989
US 2500669 A	14-03-1950	NONE	

PC

## REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

24 MRS. 1999

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference  
(if desired) (12 characters maximum) 21119PC1

## Box No. I TITLE OF INVENTION

A METHOD FOR SELECTIVELY GENERATING A FLOW OF GAS FROM AN OPEN  
END OF A TUBULAR BODY, SUCH AS A HOSE

## Box No. II APPLICANT

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

REIPUR TECHNOLOGY A/S  
Gentoftegade 118-120  
DK\_2820 Gentofte

☐ This person is also inventor.

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Facsimile No.

+45 70 20 00 76

Teleprinter No.

State (that is, country) of nationality:

DK

State (that is, country) of residence:

DK

This person is applicant  
for the purposes of:
☐ all designated  
States

☒ all designated States except  
the United States of America

☐ the United States  
of America only

☐ the States indicated in  
the Supplemental Box

## Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

REIPUR, John  
Fabritius Allé 17  
DK-2930 Klampenborg

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only (If this check-box  
is marked, do not fill in below.)

State (that is, country) of nationality:

DK

State (that is, country) of residence:

DK

This person is applicant  
for the purposes of:
☐ all designated  
States

☐ all designated States except  
the United States of America

☒ the United States  
of America only

☐ the States indicated in  
the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on a continuation sheet.

## Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf  
of the applicant(s) before the competent International Authorities as:

☐ agent

☐ common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

Plougmann, Vingtoft & Partners  
Sankt Annæ Plads 11  
DK-1250 Copenhagen K

Telephone No.

+45 33 63 93 00

Facsimile No.

+45 33 63 96 00

Teleprinter No.

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

**Box No. V DESIGNATION STATES**

The following designations are here made under Rule 4.9(a) (mark the applicable check-boxes; at least one must be marked):

**Regional Patent**

- ☐ **AP ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SZ Swaziland, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☐ **EA Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ **EP European Patent:** AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☐ **OA OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

**National Patent (if other kind of protection or treatment desired, specify on dotted line):**

- |  |  |
|--|--|
| <input type="checkbox"/> <b>AL</b> Albania                               | <input type="checkbox"/> <b>LS</b> Lesotho                                   |
| <input type="checkbox"/> <b>AM</b> Armenia                               | <input type="checkbox"/> <b>LT</b> Lithuania                                 |
| <input type="checkbox"/> <b>AT</b> Austria                               | <input type="checkbox"/> <b>LU</b> Luxembourg                                |
| <input type="checkbox"/> <b>AU</b> Australia                             | <input type="checkbox"/> <b>LV</b> Latvia                                    |
| <input type="checkbox"/> <b>AZ</b> Azerbaijan                            | <input type="checkbox"/> <b>MD</b> Republic of Moldova                       |
| <input type="checkbox"/> <b>BA</b> Bosnia and Herzegovina                | <input type="checkbox"/> <b>MG</b> Madagascar                                |
| <input type="checkbox"/> <b>BB</b> Barbados                              | <input type="checkbox"/> <b>MK</b> The former Yugoslav Republic of Macedonia |
| <input type="checkbox"/> <b>BG</b> Bulgaria                              | <input type="checkbox"/> <b>MN</b> Mongolia                                  |
| <input checked="" type="checkbox"/> <b>BR</b> Brazil                     | <input type="checkbox"/> <b>MW</b> Malawi                                    |
| <input type="checkbox"/> <b>BY</b> Belarus                               | <input type="checkbox"/> <b>MX</b> Mexico                                    |
| <input type="checkbox"/> <b>CA</b> Canada                                | <input type="checkbox"/> <b>NO</b> Norway                                    |
| <input type="checkbox"/> <b>CH and LI</b> Switzerland and Liechtenstein  | <input type="checkbox"/> <b>NZ</b> New Zealand                               |
| <input type="checkbox"/> <b>CN</b> China                                 | <input type="checkbox"/> <b>PL</b> Poland                                    |
| <input type="checkbox"/> <b>CU</b> Cuba                                  | <input type="checkbox"/> <b>PT</b> Portugal                                  |
| <input type="checkbox"/> <b>CZ</b> Czech Republic                        | <input type="checkbox"/> <b>RO</b> Romania                                   |
| <input type="checkbox"/> <b>DE</b> Germany                               | <input type="checkbox"/> <b>RU</b> Russian Federation                        |
| <input type="checkbox"/> <b>DK</b> Denmark                               | <input type="checkbox"/> <b>SD</b> Sudan                                     |
| <input type="checkbox"/> <b>EE</b> Estonia                               | <input type="checkbox"/> <b>SE</b> Sweden                                    |
| <input type="checkbox"/> <b>ES</b> Spain                                 | <input type="checkbox"/> <b>SG</b> Singapore                                 |
| <input type="checkbox"/> <b>FI</b> Finland                               | <input type="checkbox"/> <b>SI</b> Slovenia                                  |
| <input type="checkbox"/> <b>GB</b> United Kingdom                        | <input type="checkbox"/> <b>SK</b> Slovakia                                  |
| <input type="checkbox"/> <b>GE</b> Georgia                               | <input type="checkbox"/> <b>SL</b> Sierra Leone                              |
| <input type="checkbox"/> <b>GH</b> Ghana                                 | <input type="checkbox"/> <b>TJ</b> Tajikistan                                |
| <input type="checkbox"/> <b>GM</b> Gambia                                | <input type="checkbox"/> <b>TM</b> Turkmenistan                              |
| <input type="checkbox"/> <b>GW</b> Guinea-Bissau                         | <input type="checkbox"/> <b>TR</b> Turkey                                    |
| <input type="checkbox"/> <b>HR</b> Croatia                               | <input type="checkbox"/> <b>TT</b> Trinidad and Tobago                       |
| <input type="checkbox"/> <b>HU</b> Hungary                               | <input type="checkbox"/> <b>UA</b> Ukraine                                   |
| <input type="checkbox"/> <b>ID</b> Indonesia                             | <input type="checkbox"/> <b>UG</b> Uganda                                    |
| <input type="checkbox"/> <b>IL</b> Israel                                | <input checked="" type="checkbox"/> <b>US</b> United States of America       |
| <input type="checkbox"/> <b>IS</b> Iceland                               | <input type="checkbox"/> <b>UZ</b> Uzbekistan                                |
| <input type="checkbox"/> <b>JP</b> Japan                                 | <input type="checkbox"/> <b>VN</b> Viet Nam                                  |
| <input type="checkbox"/> <b>KE</b> Kenya                                 | <input type="checkbox"/> <b>YU</b> Yugoslavia                                |
| <input type="checkbox"/> <b>KG</b> Kyrgyzstan                            | <input type="checkbox"/> <b>ZW</b> Zimbabwe                                  |
| <input type="checkbox"/> <b>KP</b> Democratic People's Republic of Korea |  |
| <input type="checkbox"/> <b>KR</b> Republic of Korea                     |  |
| <input type="checkbox"/> <b>KZ</b> Kazakhstan                            |  |
| <input type="checkbox"/> <b>LC</b> Saint Lucia                           |  |
| <input type="checkbox"/> <b>LK</b> Sri Lanka                             |  |
| <input type="checkbox"/> <b>LR</b> Liberia                               |  |

Check-boxes reserved for designating States (for the purposes of a national patent) which have become party to the PCT after issuance of this sheet:

**Precautionary Designation Statement:** In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.)

Box No. VI PRIORITY CLAIM				
<input type="checkbox"/> Further priority claims are indicated in the Supplemental Box.				
Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country	regional application: regional Office	international application: receiving Office
item (1) 25-03-1998	(0428/98) PA 1998 00428	DK		
item (2)				
item (3)				

☐ The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office) identified above as item(s):

\* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):	Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):		
ISA / EP	Date (day/month/year)	Number	Country (or regional Office)

Box No. VIII CHECK LIST; LANGUAGE OF FILING

<p>This international application contains the following number of sheets:</p> <p>request : 3</p> <p>description (excluding sequence listing part) : 6</p> <p>claims : 4</p> <p>abstract : 1</p> <p>drawings : 2</p> <p>sequence listing part of description : _____</p> <p>Total number of sheets : 17</p>	<p>This international application is accompanied by the item(s) marked below:</p> <p>1. <input checked="" type="checkbox"/> fee calculation sheet</p> <p>2. <input type="checkbox"/> separate signed power of attorney</p> <p>3. <input type="checkbox"/> copy of general power of attorney; reference number, if any:</p> <p>4. <input type="checkbox"/> statement explaining lack of signature</p> <p>5. <input checked="" type="checkbox"/> priority document(s) identified in Box No. VI as item(s):</p> <p>6. <input type="checkbox"/> translation of international application into (language):</p> <p>7. <input type="checkbox"/> separate indications concerning deposited microorganism or other biological material</p> <p>8. <input type="checkbox"/> nucleotide and/or amino acid sequence listing in computer readable form</p> <p>9. <input type="checkbox"/> other (specify):</p>
---	--

Figure of the drawings which should accompany the abstract: 1	Language of filing of the international application: English
---	--

Box No. IX SIGNATURE OF APPLICANT OR AGENT

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).

Copenhagen, 24 March 1999

Plougmann, Vingtoft & Partners

Knud Erik Vingtoft

For receiving Office use only		<p>2. Drawings:</p> <p><input type="checkbox"/> received:</p> <p><input type="checkbox"/> not received:</p>
1. Date of actual receipt of the purported international application:		
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:		
4. Date of timely receipt of the required corrections under PCT Article 11(2):		
5. International Searching Authority (if two or more are competent): ISA /	6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid.	

For International Bureau use only

Date of receipt of the record copy by the International Bureau:

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference <b>21119PC1</b>	<b>FOR FURTHER ACTION</b>		See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. <b>PCT/DK99/00165</b>	International filing date ( <i>day/month/year</i> ) <b>24/03/1999</b>	Priority date ( <i>day/month/year</i> ) <b>25/03/1998</b>	
International Patent Classification (IPC) or national classification and IPC <b>A61C17/022</b>			
Applicant <b>REIPUR TECHNOLOGY A/S et al.</b>			

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.  
  
☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of **4** sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand  <b>21/10/1999</b>	Date of completion of this report  <b>30. 06. 2000</b>
Name and mailing address of the international preliminary examining authority:   European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized officer  <b>Guastavino, L</b>  Telephone No. +31 70 340 2867  

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/DK99/00165

**I. Basis of the report**

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

**Description, pages:**

1-6 as originally filed

**Claims, No.:**

1-23 with telefax of 16/02/2000

**Drawings, sheets:**

1/2,2/2 as originally filed

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:



# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/DK99/00165

## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

### 1. Statement

Novelty (N)	Yes: Claims 2-7, 9-23
	No: Claims 1, 8
Inventive step (IS)	Yes: Claims
	No: Claims 1-23
Industrial applicability (IA)	Yes: Claims 1-23
	No: Claims

### 2. Citations and explanations

**see separate sheet**

## VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

**see separate sheet**

## VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

**Re Item V**

**Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. The features mentioned in claim 1 or 8 about the plurality of cylinders had not been mentioned in the original set of claims, and as such, had not been searched.

2. Nevertheless, an additional search has been carried out about these features which brought forward (only as an example of a larger set of documents) document US-A-5551845 (**D1**), quoted here for the first time.

This document (see especially col.1/ll.11, 12; col. 3/ll.6, 7; Fig.1) discloses a device and a method according to claims 1 and 8, whereby the subject-matter of these claims lack the required novelty.

3. The additional features of dependent claims 2-7 (for the method claims) and 9-23 are not disclosed in D1, whereby the subject-matter of these claims is considered to be novel.

Nevertheless, these dependent claims do not appear to contain any features which, in combination with the features of any claim to which they refer meet the requirements of the PCT in respect of inventive step, because these claims refer to slight constructional changes in the device of claim 8 (or to the corresponding changes in the associated method claims) which come within the scope of the customary practice followed by persons skilled in the art, especially as the advantages thus achieved can readily be foreseen (see also US-A-4108178 **\_D2\_** w.r.t. claims 2-7 and 9-17; US-A-5297545 **\_D3\_** w.r.t. claim 18; FR-A-1387521 **\_D4\_** w.r.t. claims 19-22).

**Re Item VII**

**Certain defects in the international application**

1. Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1, D2, D3, D4 and GB-A-2253351 is not mentioned in the

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/DK99/00165

description, nor are these documents identified therein.

2. The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

**Re Item VIII**

**Certain observations on the international application**

The description is not in conformity with the claims as required by Rule 5.1(a)(iii) PCT.

CLAIMS

1. A method for selectively generating a flow of gas from a open first end of a tubular body, said  
5 method comprising  
connecting a second end of the tubular body directly to a gas outlet of a gas compressor,  
which is a piston compressor having a plurality of cylinders, the capacity of the gas compressor  
being selected so as to obtain through said open free end of the tubular body a desired gas flow  
rate being a flow of air used by a dentist for cleaning the teeth of a patient,  
10 starting the operation of the compressor so as to start the gas flow, and  
stopping the gas flow by stopping the operation of the compressor.
2. A method according to claim 1, wherein the compressor is driven by an electric motor, the  
operation of the electric motor being started and stopped by actuating a switch positioned on the  
15 tubular body at or adjacent to its first open end so as to control power supply to the electric  
motor.
3. A method according to claim 1 or 2, wherein the tubular body comprises a wall part being  
made from a resilient material, the open first end of the tubular body being at least partly closed  
20 and subsequently reopened while the compressor is still operating, so as to temporarily expand  
the resilient wall part, whereby a pressure pulse may be generated.
4. A method according to claim 3, wherein the wall part defining the open first end of the tubular  
body or being adjacent thereto is made from a resilient material, the open first end of the tubular  
25 body being at least partly closed by compressing said resilient wall part.

5. A method according to any of the claims 1-4, wherein liquid is selectively introduced into the open first end part of the tubular body forming a nozzle.
6. A method according to claim 5, wherein liquid is introduced into tubular body when the gas compressor is operating.
7. A method according to claim 5, wherein the liquid is sprayed out from the open free end of the tubular body when the gas compressor is not operating.
- 10 8. An apparatus for selectively producing a gas flow, said apparatus comprising
- a gas compressor which is a piston compressor having a plurality of cylinders and a gas inlet and a gas outlet,
- an electric motor for driving the gas compressor,
- means for switching the electric motor on and off, and
- 15 a tubular body of the type used by dentists for cleaning teeth, said tubular body having an open first end part and a second opposite end part communicating directly with the gas outlet of the compressor, the capacity of the compressor being such that a desired gas flow through the open first end part is obtained when the gas compressor is operating.
- 20 9. An apparatus according to claim 8, wherein the switching means is positioned on the tubular body at or adjacent to the open first end of the tubular body.
10. An apparatus according to claim 8 or 9, wherein the tubular body comprises at least one resilient wall part, manually operateable means being provided for
- 25 selectively closing the open end of the tubular body at least partly.

3

11. An apparatus according to claim 10, wherein at least the first end part of the tubular body is made from a resilient material.

12. An apparatus according to claim 11, further comprising an outer tube section made from a stiff material and surrounding the first end part of the tubular body, the manually operateably closing means being mounted on the outer tube section.

13. An apparatus according to claims 11 or 12, wherein the switching means comprise a microswitch embedded in the resilient wall of the first end part of the tubular body, the switching means being actuated when the manually operateable means are operated so as to at least partly compress and close the first end part of the tubular body.

14. An apparatus according to any of the claims 8-13, further comprising a liquid delivery tube opening into the first end part of the tubular body, and means for selectively delivering liquid into the first end part of the tubular body via the delivery tube.

15. An apparatus according to claim 14, wherein the liquid delivery means comprise a liquid pump and an electric motor for driving the pump, the operation of the electric motor driving the pump being controlled by switch means arranged at or adjacent to the first end part of the tubular body.

16. An apparatus according to claim 14 or 15, wherein the open end of the liquid delivery tube is directed towards the open end of the tubular body.

17. An apparatus according to any of the claims 8-16, wherein the tubular body is in the form of a hose of a resilient material.

18. An apparatus according to any of the claims 8-17, wherein the electric motor is a brushless DC-motor.

5 19. An apparatus according to any of the claims 8-18, wherein the piston compressor comprises a crank shaft comprising crank sections interconnected with said pistons, adjacent crank sections being flexibly interconnected by a flexible coupling device.

20. An apparatus according to claim 19, wherein the coupling device comprises a tubular  
10 member formed by a helically wound thread or wire, opposite ends of the tubular members being connected to adjacent, substantially aligned shaft ends of said crank sections.

21. An apparatus according to claim 20, wherein opposite open ends of the tubular member are adapted to receive and surround said respective shaft ends.

15

22. An apparatus according to claim 21, wherein at least one of the opposite ends of the tubular member is adapted to frictionally engage with the peripheral surface of the respective shaft end.

23. An apparatus according to any of the claims 20-22, wherein a free end of the thread or wire  
20 extends transversely into at least one of said opposite ends of the tubular member and is received in a slot or recess formed in the corresponding shaft end.

## CLAIMS

1. A method for selectively generating a flow of gas from a open first end of a tubular body, said method comprising
- 5 connecting a second end of the tubular body directly to a gas outlet of a gas compressor,
- starting the operation of the compressor so as to start the gas flow, and
- stopping the gas flow by stopping the operation of the compressor.
- 10 2. A method according to claim 1, wherein the capacity of the gas compressor is selected so as to obtain the desired gas flow rate through said open free end of the tubular body.
3. A method according to claim 1 or 2, wherein the compressor is driven by an
- 15 electric motor, the operation of the electric motor being started and stopped by actuating a switch positioned on the tubular body at or adjacent to its first open end so as to control power supply to the electric motor.
4. A method according to any of the claims 1-3, wherein the tubular body comprises
- 20 a wall part being made from a resilient material, the open first end of the tubular body being at least partly closed and subsequently reopened while the compressor is still operating, so as to temporarily expand the resilient wall part, whereby a pressure pulse may be generated.
- 25 5. A method according to claim 4, wherein the wall part defining the open first end of the tubular body or being adjacent thereto is made from a resilient material, the open first end of the tubular body being at least partly closed by compressing said resilient wall part.
- 30 6. A method according to any of the claims 1-5, wherein liquid is selectively introduced into the open first end part of the tubular body forming a nozzle.
7. A method according to claim 6, wherein liquid is introduced into tubular body when the gas compressor is operating.

REPLACED by AAT 3/4



8. A method according to claim 6, wherein the liquid is sprayed out from the open free end of the tubular body when the gas compressor is not operating.
- 5 9. A method according to any of the claims 1-8, wherein the gas flow generated is a flow of air used by a dentist for cleaning the teeth of a patient.
10. An apparatus for selectively producing a gas flow, said apparatus comprising  
a gas compressor having a gas inlet and a gas outlet,  
10 an electric motor for driving the gas compressor,  
means for switching the electric motor on and off, and  
a tubular body having an open first end part and a second opposite end part  
communicating directly with the gas outlet of the compressor, the capacity of the  
compressor being such that a desired gas flow through the open first end part is  
15 obtained when the gas compressor is operating.
11. An apparatus according to claim 10, wherein the switching means is positioned on the tubular body at or adjacent to the open first end of the tubular body.
- 20 12. An apparatus according to claim 10 or 11, wherein the tubular body comprises at least one resilient wall part, manually operateable means being provided for selectively closing the open end of the tubular body at least partly.
13. An apparatus according to claim 12, wherein at least the first end part of the  
25 tubular body is made from a resilient material.
14. An apparatus according to claim 13, further comprising an outer tube section made from a stiff material and surrounding the first end part of the tubular body, the manually operateably closing means being mounted on the outer tube section.  
30
15. An apparatus according to claims 13 or 14, wherein the switching means comprise a micro switch embedded in the resilient wall of the first end part of the tubular body, the switching means being actuated when the manually operateable

means are operated so as to at least partly compress and close the first end part of the tubular body.

16. An apparatus according to any of the claims 10-15, further comprising a liquid delivery tube opening into the first end part of the tubular body, and means for selectively delivering liquid into the first end part of the tubular body via the delivery tube.

17. An apparatus according to claim 16, wherein the liquid delivery means comprise a liquid pump and an electric motor for driving the pump, the operation of the electric motor driving the pump being controlled by switch means arranged at or adjacent to the first end part of the tubular body.

18. An apparatus according to claim 16 or 17, wherein the open end of the liquid delivery tube is directed towards the open end of the tubular body.

19. An apparatus according to any of the claims 10-18, wherein the tubular body is in the form of a hose of a resilient material.

20. An apparatus according to any of the claims 10-19, wherein the tubular body is of the type used by dentists for cleaning teeth.

21. An apparatus according to any of the claims 10-20, wherein the electric motor is a brushless DC-motor.

22. An apparatus according to any of the claims 10-21, wherein the gas compressor is a piston compressor comprising a crank shaft comprising crank sections interconnected with said pistons, adjacent crank sections being flexibly interconnected by a flexible coupling device.

23. An apparatus according to claim 22, wherein the coupling device comprises a tubular member formed by a helically wound thread or wire, opposite ends of the tubular members being connected to adjacent, substantially aligned shaft ends of said crank sections.

24. An apparatus according to claim 23, wherein opposite open ends of the tubular member are adapted to receive and surround said respective shaft ends.

5 25. An apparatus according to claim 24, wherein at least one of the opposite ends of the tubular member is adapted to frictionally engage with the peripheral surface of the respective shaft end.

26. An apparatus according to any of the claims 23-25, wherein a free end of the  
10 thread or wire extends transversely into at least one of said opposite ends of the tubular member and is received in a slot or recess formed in the corresponding shaft end.



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From the INTERNATIONAL BUREAU

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Assistant Commissioner for Patents  
United States Patent and Trademark  
Office  
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Applicant

REIPUR, John

1. The designated Office is hereby notified of its election made:



in the demand filed with the International Preliminary Examining Authority on:

21 October 1999 (21.10.99)



in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

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